Dholakia, Umesh

From: Angel Berrios [Angel.Berrios@erm.com]
Sent: Wednesday, August 21, 2013 8:29 PM
To: Dholakia, Umesh
Cc: leimarysdelgado@jca.gobierno.pr; Beatriz.Rivera@essroc.com
Subject: RE: Essroc GHG determination
Attachments: 0171815 Essroc Biomass GHG Applicabbilty Determination pdf.pdf

Umesh,
The following tables will provide a better understanding on the GHG estimates and the PSD determination. Also, see below the answers to your questions.

Applicability Determination Mass Basis Emissions GHG Pollutants Wood & \
Dorado, P.R.

Pollutants	Total Emissions Biomass PAE (tons/year)	Total Emissions 2004 & 2005 BAE (tons/year)	Net Emission Increase (tons/year)	Mass Basis Threshold (tons/year)	M M
CO2	239,076.49	241,497.19	(2,420.70)	0.00	
CH4	51.55	24.81	26.74	0.00	
N2O	6.96	3.64	3.32	0.00	

1. The fuel emission factors for each pollutant are listed on 40 CFR Part 98 Subpart C Appendix Table C-1 and C-2.
2. PAE - Projected to Actual Emissions
3. BAE - Baseline Actual Emissions

Applicability Determination Emissions Green House Gases (CO2eq)
& Wood Residuals Essroc Dorado, P.R.

Pollutants	Total Emissions Biomass PAE (tons/year)	Total Emissions 2004 & 2005 BAE (tons/year)	Net Emission Increase CO2eq (tons/year)	Major Source Threshold (ton/yr)	M
CO2eq	242,316.19	243,145.82	(829.64)	75,000.00	

1. The fuel emission factors for each pollutant are listed on 40 CFR Part 98 Subpart C Appendix Table C-1 and C-2.
2. BAE- Baseline Actual Emissions
3. PAE - Projected to Actual Emissions

Since the one of thet two conditions established by rule are not met Essroc is not subject t

GHG gases. The condition that is not met is that the net emission increase for CO2eq is nc 75,000 tons/year.

Angel

From: Dholakia, Umesh [mailto:Dholakia.Umesh@epa.gov]
Sent: Wednesday, August 21, 2013 2:44 PM
To: Angel Berrios
Cc: leimarysdelgado@jca.gobierno.pr; Beatriz.Rivera@essroc.com
Subject: RE: Essroc GHG determination

Thanks- here is my understanding of all the numbers ESSROC provided:

Baseline 2004/2005—GHG 241,497.19 tons (used only diesel and used oil to produce 579,763 tons/yr clinker)
Yes. Instead of diesel of diesel is coal. The 241,497.19 tons/year will be the emissions for CO2 as a mass based. The total emissions of CO2eq is 243,145.82 tons/year.

Projected Future Actual GHG- 239,076.49 tons (using 70,000 tons of biomass and 44614.9 of coal)(241,305 tons clinker from biomass+338,458 tons clinker from coal) [Biomass GHG 113,659.64 and Coal GHG 128,386.79 the total is 242,046 and not 239,076]

The emissions of 239,076.49 tons /year is a mass based estimated for CO2. The 113,659.64 tons/year (Biomass) and the 128, 656.55 tons/year (number corrected for Coal because of the conversion factor) is for CO2 eq.
The following tables will provide with the mass based estimated for GHG pollutants and the CO2eq emissions totals.

Please note that yesterday's e-mail states clinker production at 441,245 tons with coal/oil and not 338,458 tons?
You are right I forgot to made the change in the table. Here is thethe table with the corrections.

	Production of Clinker Per Year
PAE	579,763
Biomass	241,305
Coal & ~~Fuel~~ Used Oil	~~441,245~~ 338,458

E-mail chart numbers and the calculation sheets' numbers are a bit different?
It was an issue with the conversion factor to change from metric tons to short tons. I made the corrections and here are the final tables.

From: Angel Berrios [mailto:Angel.Berrios@erm.com]
Sent: Tuesday, August 20, 2013 9:19 PM
To: Dholakia, Umesh
Cc: leimarysdelgado@jca.gobierno.pr; Beatriz.Rivera@essroc.com
Subject: RE: Essroc GHG determination

Umesh,
Please see below for answers to your questions are in red. Also, I am including the recalculation of emissions for the purpose to include the emissions of other fuels. According to the emission estimates the use of biomass as a fuel will not trigger PSD for GHG. As stated in the past email if EPA issued new guidance or decide to continue with the biomass exemption a new assessment will be performed to determine the applicability of PSD or will continue to be under the umbrella of the exemption.

If you have any question do not hesitate to contact me.

Angel

From: Dholakia, Umesh [mailto:Dholakia.Umesh@epa.gov]
Sent: Tuesday, August 13, 2013 1:39 PM
To: Angel Berrios
Cc: Beatriz.Rivera@essroc.com; leimarysdelgado@jca.gobierno.pr
Subject: RE: Essroc GHG determination

Angel:

Will ESSROC explain how 2004/2005 emission number 228,637 tons was arrived at?

We made a recalculation to add information of the GHG pollutants and GHG emissions. For the purpose of the calculation we obtained the information of the consumption of fuel for fuel oil number 2 (diesel) and used oil which are the fuels used at the facility. The estimates were performed using the information from 40 CFR Part 98 Subpart C Appendix Table C-1 and C-2.

The following are the equation for the emission estimates for the pollutants CO2, CH4 and N2O.

Pollutant = Fuel * HHV* EF*0.00110231131

Pollutant = Annual Pollutant mass emissions for the specific fuel type (short tons).

Fuel = Mass or volume of fuel combusted per year, mass in short tons for solid fuel, and volume in gallons for liquid fuel.

HHV = Default high heat value of the fuel, from Table C-1 of this subpart (mmBtu per mass or mmBtu per volume, as applicable).

EF = Fuel-specific default CO_2 emission factor, from Table C-1or C-2 of this subpart (kg Pollutant/mmBtu).

0.00110231131 = Conversion factor from kilograms to metric short tons.

The information was corrected to include the calculations form the use of used oil. The results are the following:

	Pollutants (tons Year)		
	CO2	CH4	N2O
~~Fuel Oil Number2 (Diesel)~~ COAL	228,637.37	24.29	3.53
Used Oil	12,859.82	0.52	0.10
TOTAL	241,497.19	24.81	3.64

The number for the each pollutant will be the following: 241,497.19 tons per year for CO2, 24.81 tons per year for CH4 and 3.64 tons per year for N2O.

Baseline actual GHG should include all fuels use during the entire year and for future projected emissions using biomass should include biomass GHG and other fuels that will be used to produce almost the same amount of cement.

The Non PSD emission analysis letter dated January 18, 2013, established a baseline actual emissions (BAE) using the average of clinker production for the 2-year period of 2004-2005 of 579,763 tons/year of production. The Projected Actual Emissions (PAE) is established at the same production capacity of clinker as the BAE at 579,763 tons/year.

It is estimated that with 70,000 tons per year of biomass it is estimated total production of 241,305 tons of clinker per year. The balance of clinker that will be produced with coal or used oil will be estimated at 338,458

tons of clinker per year. The amount of clinker produced using coal or use was estimated subtracting the amount of the PAE clinker production less the production of clinker using biomass.

	Production of Clinker Per Year
PAE	579,763
Biomass	241,305
Coal & ~~Fuel~~ Used Oil	~~441,245~~ 338,458

The following table shows that the net emission increase is below the threshold established in the rule.

PTE Emissions Green House Gases Wood & Wood Residuals **Essroc D**

Pollutants	Total Emissions Biomass PAE (tons/year)	Total Emissions 2004 & 2005 BAE (tons/year)	Net Emission Increase (tons/year)	Global Warming Potential[2]	Tot CO2
CO2	239,076.49	241,497.19	(2,420.70)	1.00	
CH4	51.55	24.81	26.74	21.00	
N2O	6.96	3.64	3.32	310.00	

1. The fuel emission factors for each pollutant are listed on 40 CFR Part 98 Subpart C Appendix Table C-1 and C-2.
2. The Global Warming Potential for each of the pollutants are listed on 40 CFR Part 98 Subpart A Appendix Table A.
3. PAE - Projected to Actual Emissions
4. BAE - Baseline Actual Emissions

Also, we are including a recalculation of the GHG emissions estimates for the use of biomass as a fuel. The results is that the facility will not be subject to PSD regulations for GHG pollutants emissions and GHG emissions.

What is mton? Is it metric ton or mega ton or million ton? It is metric tons.

I do not recall if 70,000 tons of biomass takes care of 100% of cement production..will it?

? 70,000 tons/year represent up to 35 percent of the heat needed for cement production. See email of March 7, 2013. Also, the February 27, 2013 is included with information regarding the information send it to your office for these estimate.

Thanks

Umesh

From: Angel Berrios [mailto:Angel.Berrios@erm.com]
Sent: Monday, August 12, 2013 7:35 AM
To: Dholakia, Umesh

Cc: Beatriz.Rivera@essroc.com; leimarysdelgado@jca.gobierno.pr
Subject: Essroc GHG determination

Umesh,

The following is the analysis that was performed to determine the applicability of Green House Gases (GHG) submitted to EQB. This determination was made considering the court decision to vacate the exemption to comply with GHG federal regulation for biomass burning facilities. In this case the determination was made since we have a construction permit pending at EQB and the Air Quality Area requested such determination.

Essroc would like to make clear that if EPA issued new guidance or decide to continue with the biomass exemption a new assessment will be performed to determine the applicability of PSD or will continue to be under the umbrella of the exemption.

The evaluation was performed using the following guidance document: ***PSD and Title V Permitting Guidance for Greenhouse Gases***. This guidance document establish that:

PSD applies to GHGs, if:

Part A

1. *Modification is otherwise subject to PSD (for another regulated NSR pollutant), and*
2. *Has a GHG emissions increase and net emissions increase:*

a. *Equal to or greater than 75,000 TPY CO2e, and*
b. *Greater than -0- TPY mass basis*

OR BOTH:

Part B

1. ***The existing source has a PTE equal to or greater than:***

a. ***100,000 TPY CO2e and***
b. ***100/250 TPY mass basis***

and

2. ***Modification has a GHG emissions increase and net emissions increase:***

a. ***Equal to or greater than 75,000 TPY CO2e, and***
b. ***Greater than -0- TPY mass basis***

The following is the PSD determination for GHG.

For the purpose of Part A, Essroc submitted a Non PSD applicability that was approved by EPA on March 29, 2013. Since the use of biomass as a fuel is not considered a significant increase for the purpose of PSD (criteria pollutants) Part A.1, does not apply. Therefore, Part A. is not applicable to the use biomass as a fuel in the kiln.

Since Part A is not applicable then we evaluate Part B for GHG PSD purposes. Essroc is considered a major source for GHG. Since Essroc is considered a major source of GHG, we evaluate for Part B.2. to determine if the emissions are above the ***75,000 TPY CO2e*** and the mass emissions of the is greater than 0 TPY.

The following table includes the results of Essroc calculation regarding GHG. According to the evaluation certainly the emissions of GHG are above 0 TPY but the modification is below the 75,000 TPY ***CO2e*** threshold making the modification not subject to the requirements of GHG major modification.

Pollutants	Total Emissions Biomass (tons/year)	Total Emissions 2004 & 2005 (tons/year)	Net Emission Increase (tons/year)	Global Warming Potential	Total Emi CO2eq (ton
CO2	111,317.00	228,637.37	(117,320.37)	1.00	(117
CH4	37.98	24.29	13.69	21.00	
N2O	4.98	3.53	1.45	310.00	
					(116

If you have any question you can contact me or Beatriz Rivera at beatriz.rivera@essroc.com.

Angel

Angel O. Berríos Silvestre, P.E.
ERM Puerto Rico

250 Ponce de León- Suite 900- San Juan | Puerto Rico | 00918I

T +787.622.0808 | **M** +787.600.2778
E angel.berrios@erm.com | **W** www.erm.com

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Please visit ERM's web site: http://www.erm.com

Applicability Determination Mass Basis Emissions GHG Pollutants Wood & Wood Residuals Essroc Dorado, P.R.

Pollutants	Total Emissions Biomass PAE (tons/year)	Total Emissions 2004 & 2005 BAE (tons/year)	Net Emission Increase (tons/year)	Mass Basis Threshold (tons/year)	Major Source Modification (Yes/No)
CO2	239,076.49	241,497.19	(2,420.70)	0.00	No
CH4	51.55	24.81	26.74	0.00	Yes
N2O	6.96	3.64	3.32	0.00	Yes

1. The fuel emission factors for each pollutant are listed on 40 CFR Part 98 Subpart C Appendix Table C-1 and C-2.
2. PAE - Projected to Actual Emissions
3. BAE - Baseline Actual Emissions

Applicability Determination Emissions Green House Gases (CO2eq) Wood & Wood Residuals Essroc Dorado, P.R.

Pollutants	Total Emissions Biomass PAE (tons/year)	Total Emissions 2004 & 2005 BAE (tons/year)	Net Emission Increase CO2eq (tons/year)	Major Source Threshold (ton/yr)	Major Source (Yes/No)
CO2eq	242,316.19	243,145.82	(829.64)	75,000.00	No

1. The fuel emission factors for each pollutant are listed on 40 CFR Part 98 Subpart C Appendix Table C-1 and C-2.
2. BAE- Baseline Actual Emissions
3. PAE - Projected to Actual Emissions

Since the one of the two conditions established by rule are not met Essroc is not subject to the PSD requirements for GHG gases. The condition that is not met is that the net emission increase for CO2eq is not above the threshold of 75,000 tons/year.

Applicability Determination Emissions GHG Pollutants Wood & Wood Residuals
Essroc Dorado, P.R.

Pollutants	Total Emissions Biomass PAE (tons/year)	Total Emissions 2004 & 2005 BAE (tons/year)	Net Emission Increase (tons/year)	Global Warming Potential[2]	Total Emissions CO2eq (tons/year)	Major Source Threshold (ton/yr)	Major Source (Yes/No)
CO2	239,076.49	241,497.19	(2,420.70)	1.00	(2,420.70)		
CH4	51.55	24.81	26.74	21.00	561.49		
N2O	6.96	3.64	3.32	310.00	1,029.58		
					(829.64)	75,000.00	No

1. The fuel emission factors for each pollutant are listed on 40 CFR Part 98 Subpart C Appendix Table C-1 and C-2.
2. The Global Warming Potential for each of the pollutants are listed on 40 CFR Part 98 Subpart A Appendix Table A.
3. PAE - Projected to Actual Emissions
4. BAE - Baseline Actual Emissions

ESSROC BASELINE ACTUAL EMISSIONS ESTIMATES COAL & USED OIL

Coal

Overall Annual Fuel Consumption Kiln: 79,842.5 ton/year

Pollutant	tons/year	mtons/yr	GWF	mtons COeq/yr	tons CO2e/year
CO2	228637.37	207,416.33	1	207,416.33	228,637.37
CH4	24.29	22.04	21	462.75	510.09
N2O	3.53	3.21	310	993.61	1,095.27
			Total	208,872.69	230,242.73

Coal Anthracite Heating Value: 25.09 mmBTU / short ton

Oil Spec

Overall Annual Fuel Consumption Kiln: 1,167,791 gal/year

Pollutant	tons/year			GWF	Total mtons COeq/yr	tons CO2e/year
CO2	12859.82	11,666.23	mtons/yr CO2	1	11,666.23	12,859.82
CH4	0.52	0.47	mtons/yr CH4	21	9.93	10.95
N2O	0.10	0.09	mtons/yr N2O	310	29.32	32.32
Used Oil On Spec Heating Value:	0.135 mmBTU / short ton				11,705.49	12,903.09

	Coal	Used Oil
Default CO2 Emission Factor:	103.54 kg CO2 / mmBTU	74 kg CO2 / mmBTU
Default CH4 Emission Factor:	0.011 kg CH4 / mmBTU	0.003 kg CH4 / mmBTU
Default N2O Emission Factor:	0.0016 kg N2O / mmBTU	0.0006 kg N2O / mmBTU

I CERTIFY THAT I AM REGISTERED AND AUTHORIZED TO PRACTICE MY PROFESSION IN PUERTO RICO, AND THAT, TO THE BEST OF MY KNOWLEDGE, THE EMISSION CALCULATIONS AND THE DATA OF FUEL CONSUMPTION CONTAINED HERE IN ARE TRUE, COMPLETE, AND ACCURATE.

Angel O. Berrios Silvestre
NAME

18679PE
LICENSE NUMBER

SIGNATURE

ANGEL O. BERRIOS SILVESTRE
INGENIERO
LICENCIADO
LIC. #18679
PUERTO RICO

ESSROC PROJECTED ACTUAL EMISSIONS ESTIMATES FOR BIOMASS

Biomass

Overall Annual Biomass I Consumption Limit for Kiln: 70,000 ton/year

Pollutant	tons/ year	mtons/year	GWF	mtons/yr	COeq tons/year
CO2	111,317.00	100,985.08	1	100,985.08	111,317.00
CH4	37.98	34.45	21	723.48	797.49
N2O	4.98	4.52	310	1,401.73	1,545.15
			Total CO2eq	103,110.29	113,659.64

Heating Value Wood Biomass: 15.38 mmBTU / short ton

Biomass Worst Case Wood & Wood Residuals

Default CO2 Emission Factor: 93.8 kg CO2 / mmBTU

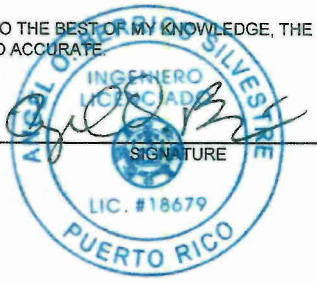
Default CH4 Emission Factor: 0.032 kg CH4 / mmBTU

Default N2O Emission Factor: 0.0042 kg N2O / mmBTU

I CERTIFY THAT I AM REGISTERED AND AUTHORIZED TO PRACTICE MY PROFESSION IN PUERTO RICO, AND THAT, TO THE BEST OF MY KNOWLEDGE, THE EMISSION CALCULATIONS AND THE DATA OF FUEL CONSUMPTION CONTAINED HERE IN ARE TRUE, COMPLETE, AND ACCURATE.

Angel O. Berrios Silvestre
NAME

18679PE
LICENSE NUMBER



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ESSROC PROJECTED ACTUAL EMISSIONS ESTIMATES FOR COAL & USED OIL

Projected to Actual Emissions (PAE) will be maintained at the same level as the Baseline Actual Emissions (BAE) established in the Non PSD Letter of January 18, 2013.

The BAE and PAE for 2004 and 2005 is estimated at: 579763 ton clinker / year

For 70000 tons/year of biomass the amount of clinker that will be produced is estimated: 241305 ton clinker / year

Therefore, for the purpose of producing clinker with coal and used oil will be: 338458 ton clinker / year

Total Heat needed for production of Clinker PAE: 338458 ton Clinker / year × 2.9 MMBtu / ton Clinker = 981528.2 MMBtu / Year

Total Coal needed for production of rest Clinker PAE: 981528.2 MMBtu / Year × Ton Coal / 22 MM Btu = 44,614.92 Ton Coal / Year

Coal (this will be the worst case scenario for the calculation of emissions of GHG pollutants).

Overall Annual Fuel Consumption Kiln: 44,614.9 ton / year

Pollutant	tons/year	.	mtons/yr	GWF	mtons COeq/y	tons CO2e/year
CO2		127759.49	115,901.46	1	115,901.46	127,759.49
CH4		13.57	12.31	21	258.58	285.03
N2O		1.97	1.79	310	555.22	612.02
			-	Total	116,715.26	128,656.55

Coal Anthracite Heating Value: 25.09 mmBTU / short ton

	Coal	Used Oil
Default CO2 Emission	103.54 kg CO2 / mmBTU	74 kg CO2 / mmBTU
Default CH4 Emission	0.011 kg CH4 / mmBTU	0.003 kg CH4 / mmBTU
Default N2O Emission	0.0016 kg N2O / mmBTU	0.0006 kg N2O / mmBTU

I CERTIFY THAT I AM REGISTERED AND AUTHORIZED TO PRACTICE MY PROFESSION IN PUERTO RICO, AND THAT, TO THE BEST OF MY KNOWLEDGE, THE EMISSION CALCULATIONS AND THE DATA OF FUEL CONSUMPTION CONTAINED HERE IN ARE TRUE, COMPLETE, AND ACCURATE.

Angel O. Berrios Silvestre
NAME

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O. BERRIOS SILVESTRE
INGENIERO
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LIC. 18679
PUERTO RICO

SIGNATURE